

KOKAI PATENT APPLICATION NO. HEI 1-133746

INK-JET PRINTER

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INK-JET PRINTER

[Inku jetto purintah]

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[There are no amendments to this patent.]

Specification

1. Title of the invention

Ink-jet printer

2. Claims of the invention

In a pressure fixing ink-jet printer system equipped with a pressure roller and a fixing drum, the ink-jet printer is structured in such a manner that there is a time differential for the printing position on the fixing drum to be positioned in the fixing position when printing is done on the fixing drum.

3. Detailed description of the invention

[Field of industrial application]

The present invention pertains to an ink-jet printer.

[Prior art]

Ink-jet printers are widely used for business since the printing noise is low. However, in a machine where liquid ink is used, use of plain paper is not always possible from the standpoint of dryness of the ink and fixing properties.

[Problems to be solved by the invention]

The purpose of the present invention is to achieve high-quality printing on plain paper through rapid drying of ink in an ink-jet printer that utilizes a liquid ink.

[Means to solve the problem]

In order to effectively prevent bleeding of ink and a long drying time when a liquid ink is printed

on a neutral paper, printing is done onto a rotating drum that generates a time differential as a result of the printing position on the drum being moved to the position for transfer to the printing paper and drying or curing of ink is promoted during transport is utilized in the present invention, and the partially-cured ink is transferred.

[Application Examples]

Fig. 1 is a structural view of an application example of the present invention. 1 is a drum made of a quartz glass, and has relatively high transparency in the ultraviolet region.

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The rotary axis of drum 1 is held by a DC supporter and the drum rotates at a constant rate in the direction indicated by arrow A in the figure. In addition, the machine is equipped with pressure roller 6 made of hard rubber, and printing sheet 9 is transported in the direction indicated by arrow B.

Meanwhile, head carriage 5 moves in a direction parallel to the axis of the drum and is driven by a belt drive powered by a stepper motor. The above-mentioned structure is shown in Fig. 3. Head carriage 5 travels along guide shafts 12 and 13 in direction D as shown in the figure, and head 4 is attached to the head carriage. 14 is the drive belt. Furthermore, 2 is a cleaning roller, and 3 is a 400 W ultraviolet lamp.

Operation of the present application example is explained below.

Head 4 is a drop-on-demand type ink-jet head, and printing can be done as a liquid ink with a viscosity in the range of 10~12 mPa.s is ejected at a response speed of 1~5 KHz, and two heads with a 12-nozzle structure are used and 24 dot matrix printing can be performed. In this case, the ink used in the present application example consists of a composition comprising 30% ultraviolet curable prepolymer, 60% monomer, 6% photopolymerization initiator, and 4% colorant, and the viscosity of the

ink is 11 mPa.s. In this case, when a 400 W ultraviolet lamp is applied at a distance of 3 cm from the surface of the paper, complete solidification of ink droplets with a diameter of approximately 10 μ m was achieved after approximately 30 seconds. Thus, the rotation speed of the drum was adjusted in such a manner that the time required for the printing position on glass drum 1 to be transported to the transferred position of pressure roller 6 was 15 seconds. In this case, the ink droplets printed on glass drum 1 were exposed to ultraviolet and curing was promoted, and subsequently they were transferred at a very high viscosity and fixed on printing paper 9 under pressure.

Fig. 2 is a structural view of a different application example of the present invention. In this case, 15 is aluminum drum and 10 is a 600 W heater. In the present application example, curing of the above-mentioned ink by heating is utilized and the viscosity of the liquid ink is increased and fixing is achieved under pressure.

Effect of the invention]

Bleeding of printed dot occurs on printed paper at times as a result of moisture in the paper and the pH of the surface, etc. The above-mentioned problem can be eliminated when an ink with high viscosity is used, but when a standard ink-jet head is used, it is not possible to achieve printing with an ink having a viscosity of several tens to several hundreds of mPa.s. On the other hand, when a time difference of several seconds to several tens of seconds is applied between printing and fixing, as in the case of the present invention, fixing is done after curing of the ink, thus, the viscosity of the ink at the time of printing can be reduced to approximately 10 mPa.s. As a result, a printer structure is possible where a conventional ink-jet head is used and where there is no reduction in response or bleeding of the print.

4. Brief description of figures

Fig. 1 is a structural drawing of an application example. Fig. 2 is a structural drawing of a different application example. Fig. 3 is an explanatory drawing showing the travel direction of the carriage.

- 1: Glass drum
- 2: Cleaning roller
- 3: Ultraviolet lamp
- 4: Printing head
- 5: Head carriage
- 6: Fixing roller¹
- 7: Pressure roller
- 8: Paper feed roller
- 9: Printing paper
- 10: Heater
- 12, 13: Guide shafts
- 14: Drive belt

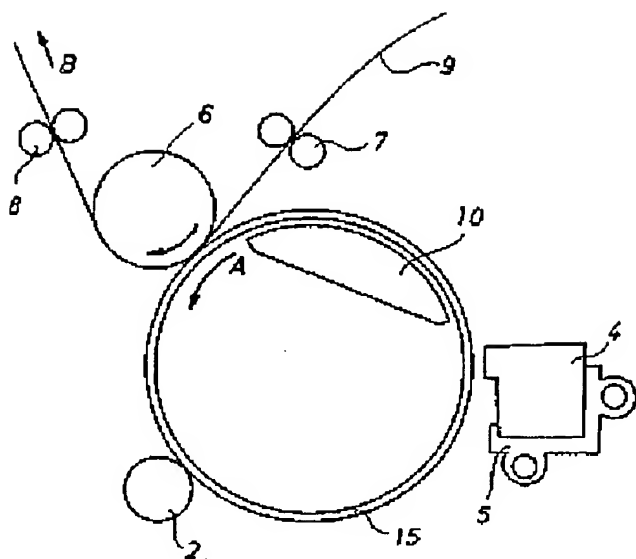
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Applicant: Seiko Epson Corp.

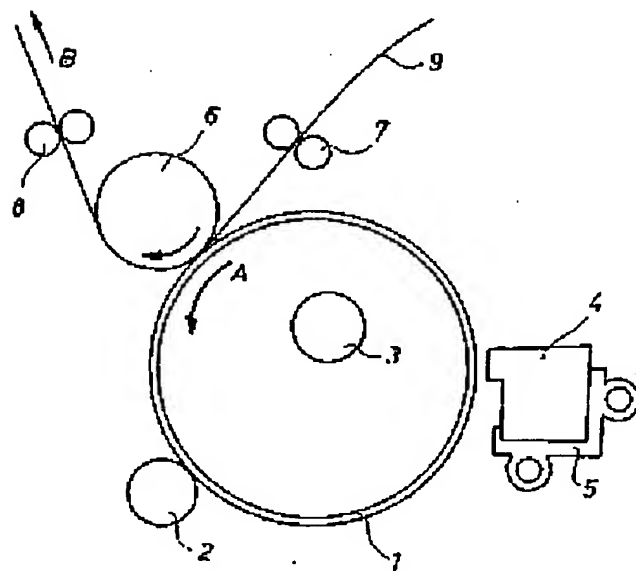
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¹Translator's note: This item is referred to as "pressure roller 6" in the text, which corresponds to the function shown in the figures.

[Fig. 1]



[Fig. 2]



[Fig. 3]

